تحديــد وجود بعض العناصـــــــــر الثقيلة في عينات رقائـــــق البطاطا فـــــي الأســـــــواق الليبيـــــــــة

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الملخص:

أجريت هذه الدراسة لتحديد مستوى بعض المعادن الثقيلة (النحاس, الرصاص) في بعض أنواع رقائق البطاطس المجمعة من الأسواق الليبية. تم تحديد التركيزات المعدنية بواسطة مقياس الطيف ألمانيا.(Thero GF95)بالامتصاص الذري في فرن اللهب والجرافيت

تم تحديد تركيز هذه المعادن في العينات ومقارنتها بالحدّ المسموح به في المواصفات والمقاييس العربية السورية لعام 2002 م ، والتي أوصى بها المركز الوطني الليبي للمواصفات والمقاييس. تراوحت التركيزات المأخوذة من العينات من 0.573 مجم / لتر إلى 2.998 مجم / لتر للرصاص ، بينما تراوحت التراكيز النحاسية من 6.4533 مجم / لتر إلى 15.3057 مجم / لتر. جميع العينات كانت تركيزات المعادن بها فوق الحد المسموح به.

Determination of some heavy metals in potato chips samples in Libyan markets.

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Abstract:

This study was conducted to determine the level of some heavy metals (pd, Cu) in some types of potato chips collected from the Libyan market. mineral concentrations were determined by Flame and graphite furnace atomic absorption spectrophotometry (thermo GF95) Germany.

The concentration of these minerals in the samples was determined and compared with the permissible limit in the Syrian Arab specifications and standards 2002 which also recommended by the Libyan National Center for Standardization and Standardization. The concentrations obtained from the samples ranged from 0.573 mg/L to 2.998 mg/L for lead, While copper from 6.4533 mg/l to 15.3057 mg/l. All samples are above permissible limit.

Introduction

Potato chips are thin slices of potato, fried quickly in oil and then salted. Potato chips are considered the most consumed at present by all age groups, especially children, and their consumption has increased due to their sweet taste and ease of obtaining in the markets. Potato chips contain a low amount of beneficial vitamins and minerals, and in return they contain high amounts of sodium and harmful fats that negatively affect cardiovascular health. (1)
Therefore, they are classified as unhealthy foods because they contain little or no nutritional value and are not considered to be of health or nutritional benefit. (2)

With the development of agricultural technology and industry, the risks of environmental and food pollution increased, especially in developing countries that depend on agriculture and industry as an important economic source. (3)

Heavy metals are one of the environmental pollutants that can cause human health problems, even in small quantities. They are mineral elements that have a high density compared to water. (4)
The presence of these minerals in foodstuffs has become a major concern around the world due to their negative effects on health. That is why many organizations and agencies, such as the World Health Organization and Agency for Toxic Substance and Disease Registry's (ATSDR), have been to protect consumers from these toxic substances in food and enact laws to legalize their presence in foodstuffs. (5)

Some of these minerals (such as Zn, Cu, Co, Mn) are considered essential, but when their concentrations increase in the body become harmful and cause various health problems. And some minerals such as lead and Cadmium has no known biological functions and It is non-degradable and therefore builds up in the food chains. toxicity problems by these minerals can appear even at low concentrations. (6)

Lead poisoning can have negative effects on the nervous and immune system. It also affects heam synthesis and cause paralysis .it is considered a carcinogen according to the International Agency for Research on Cancer (IARC) classification. (7)

Increase cupper in the body can cause symptoms like food poisoning (headache, nausea, vomiting, diarrhoea). (8)

This pollution can occur either through contamination of raw material from soil contaminated with these minerals, or during manufacturing, treatment and packaging processes in factories. (9)

Aim of work: Due to the harmful effects of pollution with these metals on health in general and on the health of children in particular, this research was conducted to estimate the percentage of heavy metals (lead, and copper) in potato chips from Libyan market.

The minerals analyzed in this paper are (pd, cu).

Materials and Methods

Material: Each chip sample was purchased from several Libyan markets.

Determination of mineral contents: Collected chips samples were dried at 70 ºC in a drying cabinet with air-circulation until they reached constant weight.

Later, about 0.5 g dried and ground sample was digested by using 5ml of 65% HNO3 and 2 ml of 35% H2O2 in a closed microwave system at 200 ˚C. The volumes of the digested samples were completed to 20 ml with ultra-deionized water and mineral concentrations were determined by Flame and graphite furnace atomic absorption spectrophotometry (thermo GF95) Germany.

Measurement of mineral concentrations was checked using the certified values of the related minerals in the reference samples received from the National Libyan of Standards.

Distilled deionized water and ultrahigh-purity commercial acids were used to prepare all reagents, standards, and samples. After digestion treatment, samples were filtrated through whatman No 42. The filtrates were collected in 50 ml flasks and analyzed.

The mineral contents of the samples were quantified against standard solutions of known concentrations which were analysed concurrently.

Instrument: Flame and graphite furnace atomic absorption spectrophotometer (thermo GF95) Germany.

Statistical analyses. Results of the research were analysed for statistical significance by analysis of variance.

RESULTS AND DISSCUSION

All samples in this paper contain heavy metals in different concentrations. All concentrations are shown in Tables (1,2).

Table (1) shows the lead concentration in potato chip samples obtained from Libyan markets.

We note that the lead concentrations ranged from 0.573 mg / L to 2.998 mg / L, where the highest concentration was in Lays (edible salt) potato and the lowest concentration was in Lorenz (pomstick cheese) potato.

According to the Syrian Arab specifications and standards 2002 which also recommended by the Libyan National Center for Standardization and Standardization, the permissible lead level is 0.2 mg/l and all samples above this level.

In case of copper, concentration ranged from 6.4533 mg/l in the B&C Mr. crunch (nacho cheese) potato to 15.3057 mg/l in crisp the world (Jalisco style) potato. Where the permissible percentage of copper according to the Syrian Arab specifications and standards 2002 which also recommended by the Libyan National Center for Standardization and Standardization is 4mg/l. all samples in this work is above this limit.

Table 1: content of (pb) in the samples of potato chips.

Name of sample	Conc.(mg/I)	Average	Std	C.V
1.Crisp the world (rio de janeiro style)	0.852 0.855 0.853	0.853	0.002	0.179
2.pringles (bursting flavor)	2.171 2.163 2.220	2.185	0.031	1.413
3.lorenz (sour cream)	0.766 0.763 0.815	0.781	0.029	3.737
4.B&C (Mr. crunch nacho cheese)	1.910 1.950 1.946	1.935	0.022	1.138
5.Rock (seasoned cheese)	2.251 2.282 2.276	2.270	0.016	0.724
6. lays (edible salt)	3.250 2.865 2.880	2.998	0.218	7.273
7.crisp the world (paris style)	1.224 1.250 1.236	1.237	0.013	1.052
8.chipsy (salt)	2.270 2.330 2.450	2.350	0.092	3.900
9.top chipsy (ketchup)	2.131 2.153 2.151	2.145	0.012	0.567
10.crisp up (cheese)	2.550 2.460 2.480	2.497	0.047	1.893
11.lorenz pomsticks(cheese)	0.559 0.584	0.573	0.013	2.249

	0.577			
12.crisp the world (Jalisco style)	2.830 2.901 2.880	2.870	0.036	1.271

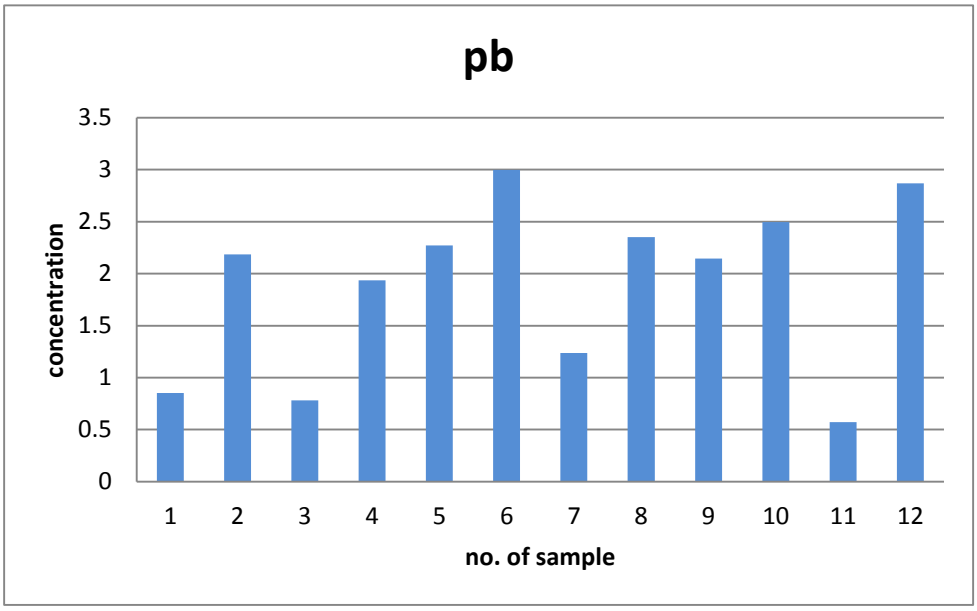
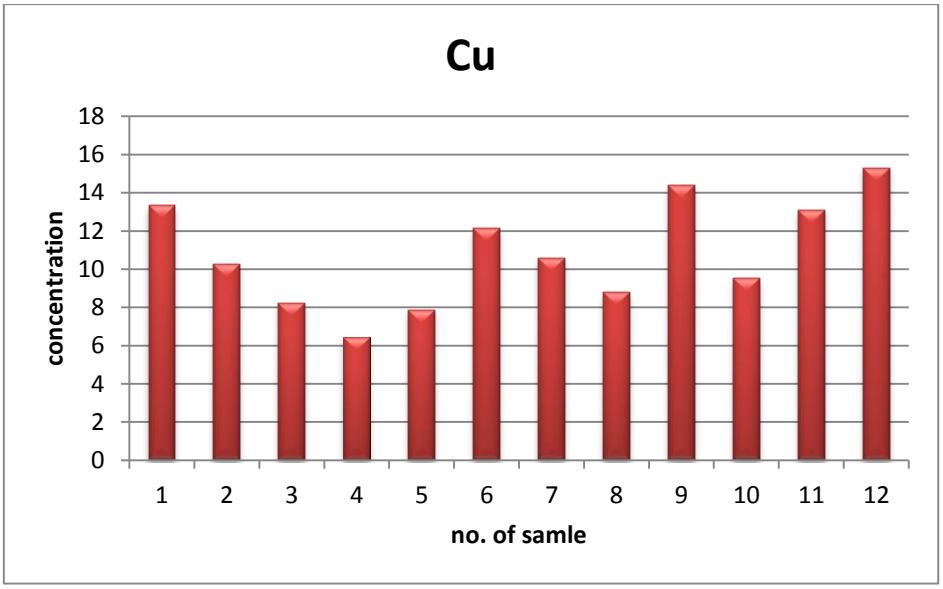


Table 2: content of (cu) in the samples of potato chips.

Name of sample	Conc.(mg/I)	Average	Std	C.V
1.Crisp the world (rio de janeiro style)	13.2200 13.5100 13.3200	13.3500	0.1473	1.1034
2.pringles (bursting flavor)	10.2400 10.1800 10.3100	10.2433	0.0651	0.6352
3.lorenz (sour cream)	8.2500 8.2260 8.2410	8.2390	0.0121	0.1472
4.B&C (Mr. crunch nacho cheese)	6.3900 6.5100 6.4600	6.4533	0.0603	0.9340

5.Rock (seasoned cheese)	7.5600 7.9200 8.1100	7.8633	0.2793	3.5525
6. lays (edible salt)	12.0400 12.2200 12.1400	12.1333	0.0902	0.7433
7.crisp the world (paris style)	10.5500 10.6030 10.5900	10.5810	0.0276	0.2611
8.chipsy (salt)	8.7500 8.7660 8.8200	8.7787	0.0367	0.4178
9.top chipsy (ketchup)	14.3300 14.3800 14.4100	14.3733	0.0404	0.2812
10.crisp up (cheese)	9.5400 9.3700 9.6320	9.5140	0.1329	1.3971
11.lorenz pomsticks(cheese)	13.0800 13.1210 13.0920	13.0977	0.0211	0.1609
12.crisp the world (Jalisco style)	15.3340 15.2900 15.2930	15.3057	0.0246	0.1606



Conclusions

From the results we obtained, it is clear that some metals are present in high concentrations in potato chips, which puts children at risk of unhealthy consumption of high levels of heavy metals.

lead, which can cause harmful effects on the kidneys, the immune system and the brain and cause cancer, even in trace amounts, are found in high levels in some types of potato chips.

Mineral concentrations differ for the same potato chips with different flavors.

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